CLAIMS

What is claimed is:

1   1.   A method for discriminating between textual content and graphical content in an image
2   comprising:
3   receiving a plurality of pixel values for a pixel line segment;
4   calculating a plurality of spatial gradients based on pixel values of adjacent pixels;
5   determining a smoothness index by processing the plurality of spatial gradients; and
6   identifying the pixel line segment as one of a text segment or a graphic segment by
7   comparing the smoothness index to a threshold value.

1   2.   The method of claim 1 wherein the step of calculating a plurality of spatial gradients
2   comprises the step of subtracting an adjacent pixel value from a current pixel value for each of
3   the plurality of pixel values.

1   3.   The method of claim 1 wherein the step of determining a smoothness index comprises:
2   calculating a first statistical characteristic of the plurality spatial gradients;
3   calculating a second statistical characteristic of the plurality of spatial gradients;
4   dividing the second statistical characteristic by the first statistical characteristic to generate
5   the smoothness index.

1   4.   The method of claim 3 wherein calculating a first statistical characteristic comprises:
2   squaring each of the spatial gradients to generate a plurality of squared gradients; and
3   generating the first statistical characteristic by summing the squared gradients.

1   5.   The method of claim 3 wherein calculating a second statistical characteristic comprises:
2   generating a plurality of absolute gradients by determining an absolute value of each of the
3   spatial gradients;
4   determining a sum value by summing the absolute gradients; and
5   generating the second statistical characteristic by squaring the sum value.

1   6. A method for discriminating between textual content and graphical content in an image

2   comprising:

3   receiving a first plurality of pixel values for a pixel line segment and a second plurality of

4   pixel values for the pixel line segment;

5   calculating a plurality of spatial gradients for the pixel line segment based on the first

6   plurality of pixel values of adjacent pixels;

7   determining a smoothness index by processing the plurality of spatial gradients;

8   calculating a value by combining the second plurality of pixel values; and

9   identifying the pixel line segment as one of a text segment or a graphic segment by

10   comparing the smoothness index to a first threshold value and the calculated value of the second

11   plurality of the pixel values to a second threshold value.

1   7. The method of claim 6 wherein the step of calculating a plurality of spatial gradients

2   comprises the step of subtracting an adjacent pixel value from a current pixel value for each of

3   the first plurality of pixel values.

1   8. The method of claim 6 wherein the step of determining a smoothness index comprises:

2   calculating a first statistical characteristic of the plurality spatial gradients;

3   calculating a second statistical characteristic of the plurality of spatial gradients;

4   dividing the second statistical characteristic by the first statistical characteristic to generate

5   the smoothness index.

1   9. The method of claim 8 wherein calculating a first statistical characteristic comprises:

2   squaring each of the spatial gradients to generate a plurality of squared gradients; and

3   generating the first statistical characteristic by summing the squared gradients.

1   10. The method of claim 9 wherein calculating a second statistical characteristic comprises:

2   generating a plurality of absolute gradients by determining an absolute value of each of the

3   spatial gradients;

4   determining a sum value by summing the absolute gradients; and

5   generating the second statistical characteristic by squaring the sum value.

1   11. The method of claim 6 wherein the step of calculating a value by combining the second

2   plurality of pixel values further comprises the step of calculating the maximum of the second

3   plurality of pixel values.

1   12. The method of claim 6 further comprising the steps of:

2   receiving a third plurality of pixel values for the pixel line segment; and

3   calculating a value by combining the third plurality of pixel values, and wherein the step of

4   identifying the pixel line segment as one of a text segment or a graphic segment further

5   comprises comparing the calculated value of the third plurality of pixel values to a third

6   threshold value.

1   13. The method of claim 12 wherein the step of calculating a value by combining the third

2   plurality of pixel values comprises the step of calculating the maximum of the third plurality of

3   pixel values.